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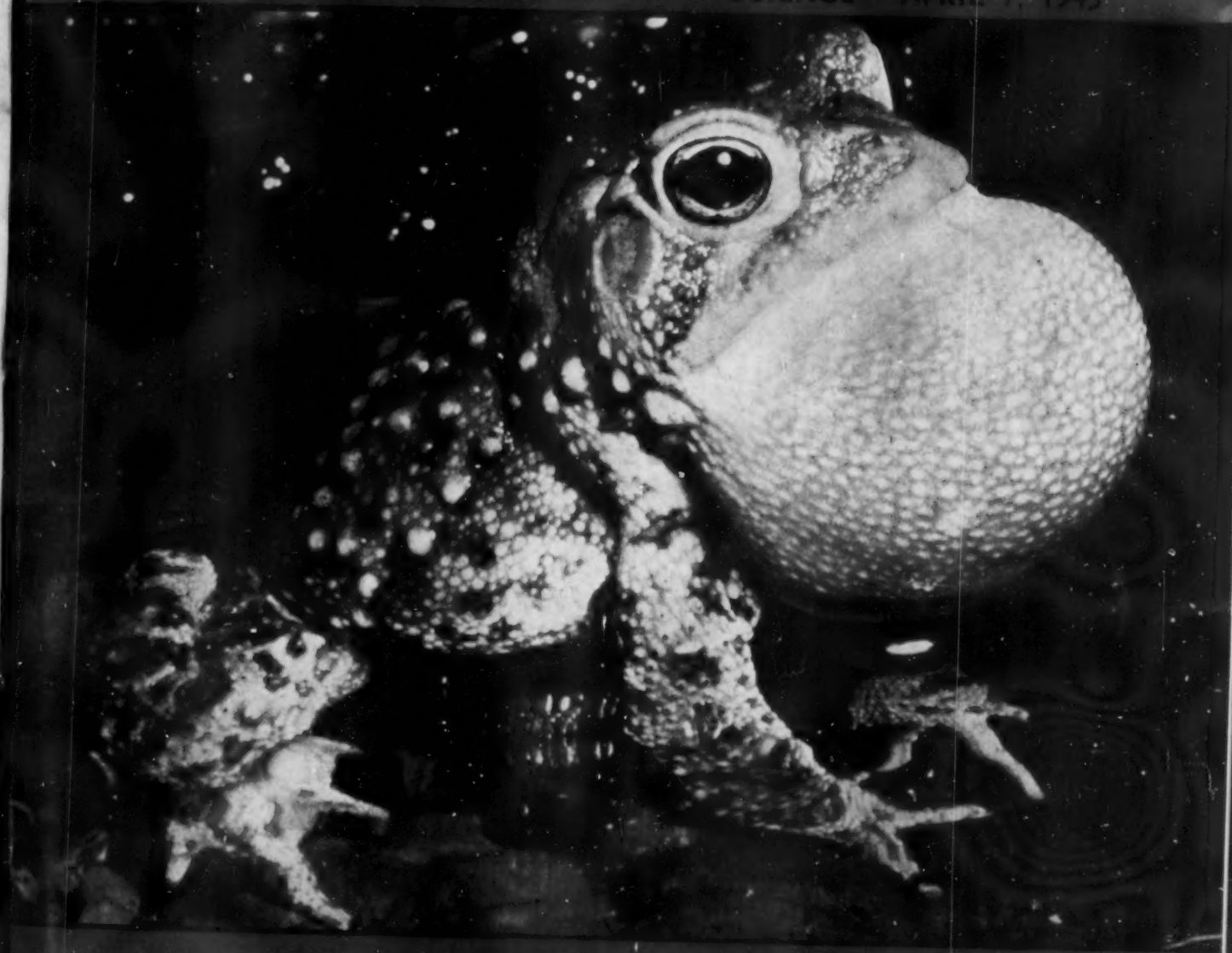
TECHNOLOGY DEPT.

SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE • APRIL 7, 1945



Chanson d'Amour

See Page 216

A SCIENCE SERVICE PUBLICATION

The Electron Microscope reveals the fine details of human tooth canals (cross-section shown in background of photo above).

RCA Electron Microscope—a new tool for dentistry

SEEN FOR THE FIRST TIME: the exquisite details of tooth canals! There are about 50 miles of canals or tubules in each human tooth! Yet never before could they be visualized so clearly for "close-up" examination of their tiniest details.

SEEN FOR THE FIRST TIME: entirely new tooth structures and surface irregularities, the very existence of which had until now been in doubt!

How SEEN?—through the RCA Electron Microscope, developed and perfected at RCA Laboratories. This Electron Microscope—with useful magnification up to 100,000 diameters and more—is a most efficient new tool for dental science—and one that promises to lay open the innermost hidden secrets of tooth structure and composition.

Besides aiding dentistry, the RCA Electron Microscope is already serving 27 different fields of science and industry.

Such research, as resulted in the Electron Microscope, goes into **all** RCA products. When you buy an RCA radio or television receiver, or a Victrola—made exclusively by RCA Victor—you get the greatest satisfaction . . . enjoy a unique pride of ownership. For if it's an RCA, you can rest assured it is one of the finest instruments of its kind that science has achieved.

Dr. V. K. Zworykin (seated at left), Associate Research Director of RCA Laboratories, with Perry Smith (standing) and Dr. James Hillier at a portable type desk model of the RCA Electron Microscope—the new tool for modern science and industry.

RADIO CORPORATION of AMERICA

PIONEERS IN PROGRESS

RCA

ENGINEERING

New Type Locomotives

New powerful high-speed coal-burning steam turbine engine has been designed. The cab and boiler section is between coal and water compartments.

➤ A NEW type of steam turbine locomotive, a coal-burner with great power and high speed, has been designed in an unusual arrangement having its coal compartment at the forward end, a combination cab and boiler section, with the smokestack at its rear, for its central part, and a water compartment following. The coal and the cab-boiler sections are supported by a single cast-steel frame mounted on two swiveling trucks, one under the coal compartment and the other under the boiler. Behind the boiler is coupled the water compartment.

This new turbine locomotive, which will be known as the "Triplex", is a development of the Pennsylvania Railroad, which recently put into service the first direct-drive steam turbine locomotive built in this country. The Triplex is approximately 137 feet in length, with a wheel base of 122 feet, but because of its swiveling trucks will be able to operate around any curve that a standard passenger car can negotiate.

The new locomotive, like the steam turbine already in use, does not have the familiar piston rods and other reciprocating parts of the conventional steam engine. This makes it possible to use smaller driving wheels, which permits larger boiler capacity for the same road clearances, and improves the locomotive's efficiency.

A unique feature, to maintain weight in the coal compartment over its driving wheels as coal is consumed, is an arrangement by which water from the water compartment automatically flows to a tank in the coal compartment, and returns to the water tender automatically when a new supply of coal is taken on. Mounting the coal compartment on the same frame as the boiler keeps alignment between the boiler and the coal pile and thus simplifies the operation of the mechanical stoker.

An electrically driven locomotive powered by a coal-burning steam turbine engine has been designed, and three of them will soon be constructed for the Chesapeake and Ohio Railway by the Baldwin Locomotive Works and the Westinghouse Electric & Manufacturing Company. No electrically driven locomotive powered by steam turbine is in operation in the United States at the present time.

In the new locomotive, in a single self-contained unit, the coal is carried in the head instead of in a tender, the engineer's cab is next, then the boiler, and last the electric motors that drive the wheels. The engine is designed to develop 6,000 horsepower and the locomotive will be capable of running more than 100 miles an hour under full load even on grades. Smoothness of operation is one of the results fully expected.

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GENERAL SCIENCE

Franklin Medal Will Go to Dr. Harlow Shapley

➤ The FRANKLIN medal, the highest award of the Franklin Institute, will be presented to Dr. Harlow Shapley, director of the Harvard College Observatory, at the Medal Day dinner on April 18. The award is made for his valuable contributions to the science of astronomy, and especially for his work "in the measurement of the vast distances necessary for the determination of the nature and extent of our galaxy, as well as those of other galaxies external to ours."

Walter J. Coppock of Moyland, Pa., and Greer Ellis of Chicago will receive Franklin Institute certificates of merit at the same dinner. Mr. Coppock designed a novel and theoretically sound motor base which gives automatic belt tension under varying load conditions, and Mr. Ellis developed brittle lacquers for strain measurement and a technique for their use.

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EDUCATION

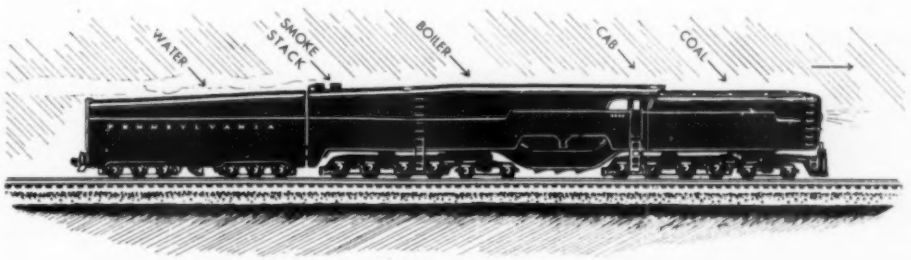
Rockefeller Grant for Postwar Graduate Degrees

➤ WAR RESEARCH workers in and out of uniform will be able to go back to graduate school through a Rockefeller Foundation grant of $335,000 to the National Research Council, recently announced.

This temporary, nation-wide program for postwar pre-doctoral fellowships is intended to encourage resumption of graduate study in the natural sciences by those who had to interrupt their education to engage in war work. The money value of the fellowships will be sufficient so that those given them will be able to devote essentially full time to working for their Ph.D. degrees.

"The almost complete cessation of consecutive professional training which has occurred in scientific fields will make impossible for some time the normal accession of additional highly trained personnel," the announcement explained. "These losses, in the face of sharply increasing demands for such personnel, will inevitably retard to the danger point the resumption of scientific progress after the war. The resulting handicap to postwar industrial recovery, public health, and military security is a matter of national concern."

This program as announced is intended to help alleviate the very serious set-back to American scientific competence resulting from the war's interference with normal educational processes.



THE "TRIPLEX"—This ultra-powerful type of steam turbine locomotive has been designed by the Pennsylvania Railroad for fast, heavy duty freight and passenger service. Coal will be carried in the front, shown to the right of the picture, and water supply in the rear. The cab will be ahead of boiler and smoke stack, reversing the usual order.

Although the program will not be inaugurated immediately, it is being announced now so that those in war work will stay on their war research jobs without fear that they may not be able to continue their graduate training later.

The new program will be able to furnish assistance to only a fraction of all graduate students. It is planned so as not to divert to full time study those who in the postwar year will be needed part-time to help teach in over-burdened colleges and universities.

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AERONAUTICS

Take-Offs in 4 Seconds

"Rato" puts airplanes into the air in record-breaking short time, only 200 feet from starting point on the deck of carriers. Long runways may be thing of the past.

➤ BRITISH naval planes literally leap from the decks of the Royal Navy's aircraft carriers these days. The secret is new and powerful rockets that can put planes in the air in four seconds after a run of only 200 feet from a dead start. Only recently developed through the cooperative efforts of British government and industry, rocket-assisted take-off will probably soon be nicknamed "RATO", since it is a close relative to jet-assisted take-off, commonly called "JATO."

Unlike JATO, which is now used to lift the weight of heavy flying boats off the water during take-off, RATO is a successful solution to the problem of reducing take-off time and distance which has puzzled aeronautical engineers for years. In a detailed description of rocket assisted take-off, published in *Flight* magazine, C. B. Bailey-Watson predicts that RATO will do away with the long airport runways, which it is now believed tomorrow's giants of the sky must have.

In using RATO, a rocket firing point is plainly marked on the carrier deck several feet ahead of the point where the take-off run begins. The actual footage in many cases is around 100 feet but it varies with the weight of the plane and the velocity of prevailing winds. When ready, the pilot moves his plane down the deck of the flat-top exactly as he would do in making an unassisted take-off. The moment he comes abreast of the rocket firing marker, he presses an electric button in the cockpit. This sets off two to four rockets. Split seconds later he is in the air, where he proceeds to jettison the spent rocket tubes before setting out on his mission.

Weighing 66 pounds, each standard RATO rocket consists of a cold-drawn steel tube with a wall about as thick as a pie crust, 41 inches long, and five inches in diameter. This tube is loaded with 26 pounds of cordite, a smokeless powder, used as the propellent charge. In operation, the gases generated by the rapidly burning cordite after it is fired are expelled at high velocity through a venturi tube incorporating a four-inch nozzle.

RATO equipment is constructed so that when the airplane takes to the air four seconds after the rockets are fired the propellent charge is completely consumed, and the tubes can be dropped. If the tubes were not jettisoned they would interfere with the speed and efficient operation of the plane. The maximum thrust of the rockets is developed about a tenth of a second after firing. The mean thrust developed by the rockets is about 4,400 pounds. This almost equals the thrust produced by several high-horsepower airplane engines.

RATO rockets produce no flame, and very little smoke during the take-off, although an onlooker will hear a loud crack, like the snap of a whip, when the rockets are set off electrically, and a very little flame can be seen from their nozzles just before the propellent charge is exhausted.

In the United States, naval aircraft are using rocket-assisted take-off equipment, Mr. Bailey-Watson stated, but did not explore the matter further. Following a successful experimental installation of RATO on a Vought-Sikorsky Chesapeke, the British adapted it for use on the single-engine carrier-based Seafire, Swordfish, and Barracuda planes.

The Seafire uses two rockets mounted in a box container on the top of each wing near the fuselage; four rockets in all. The rockets are set at such an angle that their lines of thrust pass near the plane's center of gravity, and so that the hot rocket gases cannot damage the airplane tail structure. The rocket mechanisms are attached to the fuselage just ahead of the cockpit by tubular struts extending from the forward end of the box container.

The Barracuda carries two pairs of rockets attached beneath the wing on either side of the fuselage, with the rocket tubes extending well beyond the trailing edge. Swordfish require only two rockets to lift them from the deck.

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A hundred gallons of crude *petroleum* yields approximately 44 gallons of gasoline, 36 gallons of fuel oils, 6 gallons of kerosene, 3 gallons of lubricants, and 8 gallons of coke, asphalt, wax and other products.

SCIENCE NEWS LETTER

Vol. 47 **APRIL 7, 1945** *No. 14*

The weekly Summary of Current Science, published every Saturday by SCIENCE SERVICE, Inc., 1719 N St., N. W., Washington 6, D. C. NOrth 2255. Edited by WATSON DAVIS.

Subscriptions—$5.00 a year; two years, $8.00; 15 cents a copy. Back numbers more than six months old, if still available, 25 cents. Monthly Overseas Edition: By first class mail to members of the U. S. armed forces, $1.25 a year. To others outside continental U. S. and Canada by first class mail where letter postage is 3 cents, $1.25 where letter postage is 5 cents $1.50; by airmail, $1.00 plus 12 times the half-ounce airmail rates from U. S. to destination.

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Entered as second class matter at the postoffice at Washington, D. C., under the Act of March 3, 1879. Established in mimeographed form March 18, 1922. Title registered as trademark, U. S. and Canadian Patent Offices. Indexed in Readers' Guide to Periodical Literature, Abridged Guide, and the Engineering Index.

The New York Museum of Science and Industry has elected SCIENCE NEWS LETTER as its official publication to be received by its members.

Member Audit Bureau of Circulation. Advertising Representatives: Howland and Howland, Inc., 393 7th Ave., N.Y.C., PEnnsylvania 6-5566 and 360 N. Michigan Ave., Chicago, STAte 4439.

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MEDICINE

Penicillin Price Drops

Since the March 15 general release for civilian use, the cost of the drug has dropped from $2.40 per 100,000 Oxford units to as low as $1.54 per 100,000 units.

➤ THE COST of being sick, when the illness is one that responds to penicillin, is going down.

The price of the drug itself has dropped, since the March 15 general release for civilian use, from $2.40 per 100,000 Oxford units to as low as $1.54 per 100,000 units. This last figure is a wholesale price and the price to a physician may be $1.80 to $2.00 per 100,000 units.

This amount, 100,000 Oxford units, is enough to cure one case of gonorrhea. Most other illnesses require considerably more of the drug, depending on how early treatment is started and how severe the illness is. For syphilis two to four million units may be required. For osteomyelitis, a bone infection that is usually long drawn-out, as much as five million units may be needed. From 500,000 to 1,000,000 units are required for most illnesses in which penicillin is the drug of choice.

The price of sulfa drugs, which can be used for some of the same conditions as penicillin, is less than the price of penicillin. The cost of getting well may be cheaper when penicillin can be used, however, because recovery is quicker. This means less time in the hospital, a smaller bill for the hospital room or bed, and a quicker return to work and earning.

Sulfa drug treatment, however, can sometimes be given at home. The patient does not have to be stuck with a hypodermic needle every three or four hours day and night, as he does when undergoing penicillin treatment. The method of giving penicillin requires more visits by the doctor or more nursing attendance, which is likely to be reflected in the total cost of the illness.

The reasons for the low and possibly still lower cost of penicillin are competition and increased production. Production took a big jump in February, just before the drug was released for civilian use generally. The production increase is expected to continue, so it is reasonable to suppose the price will continue to drop.

The OPA ceiling of $10 per 100,000 units has not been revised, partly because of the drop in price and partly because of the time lag involved. It would take about two months for OPA to collect and analyze figures on which to set a new ceiling, by which time, if production continued to increase, the price would again be lower.

How cheap penicillin will ultimately become will depend upon the cost of manufacture as methods improve and upon trade conditions.

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CHEMISTRY

Invisible Glass Wins Award for Dr. Blodgett

➤ THE AMERICAN Association of University Women announced that the annual Achievement Award of $2,500 goes to Dr. Katharine B. Blodgett of General Electric Research Laboratory at Schenectady, N. Y., for her work on building films of almost infinitesimal thickness.

Dr. Blodgett's invention of "invisible glass" has received widespread public recognition, but this is only a by-product of her long-time research, the awards committee pointed out. It was during her study of methods of building films, frequently only one molecule thick, that she developed a process of depositing a non-reflective film on glass. Her study of two-dimensional films, with a total thickness only one-quarter of a wavelength of light, has contributed to the efficiency of the lenses of submarine periscopes and aerial cameras by preventing wasteful loss of light through reflection. Another application of her work on molecular films is a gauge she devised for measuring, by light reflection, the thickness of any transparent or semi-transparent substance within a range of one- to twenty-millionths of an inch.

"Anyone who wishes to measure the thickness of a film which is only a few millionths of an inch thick can compare the color of his film with the series of colors in the gauge. The step on the gauge that matches his film in color will give him a measure of its thickness," Dr. Blodgett said at the meeting.

Dr. Blodgett received the award at ceremonies held on March 29 at the National Museum in Washington, D. C. This is the third year that the Achieve-

"BUILT-UP" FILM—Dr. Blodgett, working in her laboratory at the General Electric Company, is building the thin films, which afford scientists a valuable thickness gauge, by dipping them in and out of the water. The crank in her left hand raises and lowers the glass which holds the film.

ment Award, contributed annually by the Northwest Central Region of the AAUW, has been presented to an outstanding woman scholar in recognition of distinguished achievement.

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METALLURGY

Future of Light Metals

Postwar uses of aluminum and magnesium may require heavy production. Heavy metals may be replaced where weight is not essential.

➤ ALUMINUM and magnesium, often called "Al and Mag" for short, and also the "magic" metals, have had their day in Congress at hearings before the Senate Small Business Committee, which is considering, among other matters, the future of these light metals and what to do about the government's investment of over a billion dollars in plants for their production.

Producers of these light metals, and users extending from aircraft manufacurers to kitchen utensil fabricators, were heard. Representatives of heavy industries, such as builders of automobiles, railroad cars, and farm machinery, presented opinions of their possible future uses in their industries by invitation of the committee.

Aluminum naval destroyers able to travel at 60 knots, as well as magnesium truck and trailer bodies, were predicted by Henry A. Kaiser, the shipbuilder, who stated that plans for the destroyer are already complete and that magnesium-bodied trucks are now on the road. These bodies cost twice as much as bodies of steel, but, on those now in use by one of his companies, can haul four tons more pay-load. He suggested that the government plants be leased or sold to private companies.

The supply of magnesium in the United States is limitless, declared Dr. Willard H. Dow, head of the Dow Chemical Company. The only limit is the amount of electricity available for its production. Magnesium as a metal, he said, has been known for more than a century, but only for about 25 years has it developed as a structural material. Then it was found that if other metals are mixed with magnesium in various proportions, the alloy gives magnesium a new character and it becomes a tough, easily machined, corrosion-resisting metal in every way suitable for construction in which light weight matters. He suggested many possible uses, including aircraft, railroad equipment, automobile and truck bodies, furniture, shipping containers, machinery, home construction, and in the oil industry, particularly to protect pipe lines from electrical deterioration.

Aluminum production by the Reynolds Metals Company, which up until 1941 was a fabricator, not a producer of this metal, was discussed by R. S. Reynolds, president of the company. The possibilities in the future for aluminum are enormous, he said, but so are the problems. "If the government adopts sound policies for the disposal of its own plants and for their subsequent operation, real dividends in jobs and consumer goods will be produced."

On the question of the policy to be adopted in the disposition of government-owned aluminum plants, I. W. Wilson, of the Aluminum Company of America, declared that laying down a hard-and-fast rule at this time would be an unwise step for Congress to take. No one can now tell the length of time that will be required to develop postwar aluminum markets.

"A year after peace has been made," he said, "Congress and the industry will be better able to gauge the future; two years after peace they may be still better able to judge the future."

He referred to the possibilities of the use of vast quantities of light metals in the construction of naval vessels, passenger and cargo ships. He submitted a list of 2,000 items in which aluminum was or could be used to advantage.

Light Metals in Aviation

➤ ADOPTION of a national air power policy for the development of postwar military and civilian aviation is necessary to assure realization of present promising opportunities for the light metals in the aircraft field, Eugene E. Wilson, president of the Aeronautical Chamber of Commerce, told the committee.

"The future of air transport, civil and military, is more dependent upon light metals than that of any other industry," he said. "The extent of the postwar demand for light metals from the aircraft manufacturers cannot be foretold because the volume of postwar production of military and commercial planes largely depends upon public policy, which Congress must determine."

There will be little change in the relative quantities of steel, iron, aluminum and magnesium in civilian postwar cars as compared with the ratios established in prewar production, according to J. S. Laird of the Ford Motor Company. Magnesium is unsuitable for more than a few of the many items which make up an automobile, and its use is ruled out for engine parts which are highly stressed, or must be wear-resistant, as well as for water-cooled cylinder blocks and heads, he stated. Aluminum castings have been used successfully, he continued, in cylinder blocks, cylinder heads, oil pans, pistons, timing gears and housing.

"Wheel type and tracklaying tractors for farm or industrial uses depend largely upon their weight to develop satisfactory draw-bar power," declared A. W. Scarratt of the International Harvester Company at one of the hearings. Tillage and harvesting machines, such as plows, harrows and mowers, also require weight, so that no appreciable use of the light metals may be expected in these machines, he said, and their use will be confined to relatively few parts.

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GENETICS

Multiple Births More Frequent Among Negroes

➤ WHEN the stork carries a double burden he is more likely to set it down in a Negro home than among whites, analysis of U. S. birth registration data revealed to Prof. Herluf H. Strandskov, of the University of Chicago.

Quadruplets, very rare among white births, occur more than twice as often among the Negroes, Prof. Strandskov found. There are four babies born at the same time to white mothers only once in every 570,196 confinements. Quadruplets are born to Negro mothers once in every 237,897 confinements.

For triplets the figures are one set for each 9,182 confinements for whites; one in 5,076 for Negroes. Twins come once in 88 or 89 confinements for whites; 1 in 70 for Negroes. The average for all races in the United States is 1 in 86.

The findings on the difference in frequency of multiple births among different races are reported in the *American Journal of Physical Anthropology*, (March).

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COMMUNICATIONS

Microwave Radio Relay

This method of transmission of long distance phone calls, television and sound will get a chance to prove its worth in New York to Boston tests.

➤ CAST in the role of guinea pigs, New York and Boston will co-star in a proposed elaborate test to determine the efficiency and economy of microwave radio relay for the transmission of long-distance telephone calls and sound and television broadcast programs, as compared with transmission over wires and cables. The two cities were selected on the basis of the need for additional communications facilities linking them.

With approval granted for terminal stations at New York and Boston, the American Telephone and Telegraph Company has made application to the Federal Communications Commission for authority to construct seven relay stations joining terminals. These relay stations, consisting of transmitters and receivers connected to highly directive antenna systems, will pick up and amplify the radio waves and beam them on to the next station where the process will be duplicated until a terminal is reached.

The FCC has been asked to allocate eight channels for the tests in the microwave part of the radio spectrum, to provide two simultaneous transmissions in each direction. For the present, and until the completion of experiments, the proposed facilities will not be available for commercial use.

Reception in the microwave region of the radio spectrum is very satisfactory since there is almost no static or fading. The highly directive antennae can concentrate the energy in a narrow beam, thereby increasing the signal strength. If the tests are a success, the relay network may be spread out in all directions to provide radio relay communications to nearby cities and towns. Due to the fact that microwaves do not travel much beyond the horizon, the same set of frequencies can be used over and over again at alternate relay stations.

Since communication is not possible much below the line of sight in the microwave region of the spectrum, sites for the relay stations were chosen for their elevation. The highest proposed station is 1,395 feet above sea level on Asnebumskit mountain in central Massachusetts. The lowest proposed relay station would be located on Bear Hill, Mass., with an elevation of 355 feet. The Bear Hill-to-Boston leg is about 11 miles, the shortest relay distance in the system. The longest legs in the system, both approximately 35 miles, extend from the New York terminal station atop the A. T. & T. Long Lines Building in lower Manhattan to Jackie Jones mountain (elevation 1,240 feet), north of New York City and west of the Hudson River; and from there to Birch Hill (elevation 1,330 feet), near Pawling, N. Y., and the Connecticut state line. The remaining three stations would be located on Spindle Hill (elevation 1,020 feet) between Waterbury and Hartford, Conn.; John Tom Hill (elevation 875 feet) near Glastonbury, Conn.; and Bald Hill (elevation 1,286 feet) close to the Connecticut-Massachusetts state line.

If commercial facilities are established satisfactorily as a result of these experiments, the microwave radio relay system may eventually be connected with the Bell Telephone coaxial cable that already connects New York and Washington. This would provide facilities for television, sound, and long distance telephone transmission from Boston to Washington. Later on, it might be connected to a nationwide coaxial cable network.

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NEW SUIT TESTED—These two men are floating "comfortably" on freezing water. The nylon suit was designed to protect the wearer from the initial shock of entering the cold water and decrease the effects of exposure from spray and wind when he is floating on an Emergency Rescue raft. (See SNL, Mar. 10.) Official U. S. Army Air Forces photograph.

BOTANY

Cork Oak Trees Planted In Honor of Servicemen

➤ MEMBERS of the Armed Forces from Moss Point, Miss., will have cork-oak trees growing in their honor on the high school campus. The cork-oak seedlings were planted there by the Science Club in February as part of the project conducted by Science Clubs of America to increase the cork supply of the United States, largest user in the world.

Cork, used in life belts and for thermal insulation, comes from the cork oak, which can be grown commercially in 23 states in the Union. Science Clubs located in these states, mostly in the South and Far West, are studying specimens of bark and leaves, pictures of the tree and the acorns, and details of planting and growing.

In Baltimore the Parent-Teachers Association has donated land for 4,000 seedlings.

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CHEMISTRY

Gas-Mask Filter From Short Cellulose Fibers

➤ STRAW and other farm wastes, even stalks of wayside weeds, can be put to good use in protecting the lives of our fighting men if cornered Axis forces finally resort to poison-gas warfare. Two U. S. Department of Agriculture chemists, Dr. E. C. Lathrop and S. I. Aronovsky, of the Northern Regional Research Laboratory at Peoria, Ill., have just been granted U. S. patent 2,372,437 on a gas-mask filter medium in which short cellulose fibers from straw and other neglected materials play an important part.

Long fibers of alpha cellulose, from wood pulp or cotton linters, are standard constituents of such filters, the two inventors explain. However, they require the addition of shorter fibers to increase their adsorbent capacity. Short asbestos fibers can be used, but these are difficult to separate out from the general mass of asbestos and hence are comparatively costly. This objection does not apply to the short, highly adsorbent fibers of alpha cellulose that can be obtained in abundance from straw and stalk materials.

Rights to manufacture and use the newly patented filter medium are assigned royalty-free to the government, through the Secretary of Agriculture.

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ANTHROPOLOGY

Scientists Disagree on Age of Ancient Skull

➤ HOW LONG has Australia had human inhabitants?

This question is being threshed out anew as a result of the discovery of a human skull in an undisturbed deposit estimated to be 50,000 years old, near Keilor, Australia. This would seem to give the skull an age of 500 centuries.

However, Dr. Franz Weidenreich of the American Museum of Natural History has made a careful examination of the specimen, and he states, in the *Journal of Physical Anthropology* (March), that this skull is very similar to another ancient Australian relic, known as the Wadjak skull, which was found in 1889, and which has a generally agreed-on age of only 20,000 years. If Dr. Weidenreich is correct in his identification of the Keilor skull as belonging to the Wadjak people, a really ancient human type is yet to be found in Australia.

A possible complication in the problem may arise from the fact that "modern" types of human skulls have been found at apparently the same levels with undoubtedly ancient, primitive skulls, in other parts of the world. Could this mean that modern types evolved early, and perhaps at several different times? Dr. Weidenreich is inclined to think not. He feels that in such cases the dating is in error, and that more reliance can be placed on the skull type than on the geological level of burial.

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METALLURGY

Magnesium, Steel, Cement From the Same Minerals

➤ A PROCESS that yields magnesium, alloy steel and cement from the same operation is the subject of patent 2,372,571, issued to Dr. Fritz J. Hansgirg, Austrian-born metallurgical chemist who since 1940 has been in this country where, among other jobs, he aided Henry Kaiser in setting up his big magnesium plant at Permanente, Calif.

Dr. Hansgirg's new process is designed to make use of silica-containing ores of magnesium, such as serpentine, olivine, etc. The mineral is finely powdered, mixed with calcium carbide and compressed into tablets. These are heated in a retort, under vacuum. The magnesium is driven off as a vapor, which on cooling yields the metal in solid, pure form.

The slag or clinker contains fine particles of alloy steel, rich in chromium and titanium; sometimes iron ore must be added before processing, if the natural mineral does not contain enough iron. The steel particles are extracted with a magnetic separator, and the silicious residue goes to the cement mill.

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ZOOLOGY

American Toad Trills Love Song to Lady Friend

See Front Cover

➤ THE AMERICAN TOAD lives in and around shallow ponds during the spring mating season. During this season he serenades his lady with one of the sweetest sounds that may be heard in the frog-pond chorus. While the toad is trilling his love song, he blows up his throat to immense proportions, as shown in the photograph by George A. Smith on the front cover of this SCIENCE NEWS LETTER. While in the water the toad has a beautiful caramel brown color, and an eye that classical writers have referred to as a precious jewel.

Science News Letter, April 7, 1945

IN SCIEN

CHEMISTRY

Shrinkage Controlled By a Melamine Resin

➤ WOOL CLOTH may be shrunk, and its shrinkage controlled, by the use of a melamine resin developed by the American Cyanamid Company which had an exhibit in New York of tailored suits made of wools treated under the new process. The melamine resin will be known as Lanaset, and the treated cloth cuts and drapes better, retains its original shape and can be laundered, it is claimed.

Lanaset stabilizes wool and wool blends without affecting the absorbency normally characteristic of wool. Other claims are that it reduces felting or matting of the wool upon laundering, and prevents pilling and fuzzing. It can be used also with blends of wool and rayon and in tropical worsteds for men's suits. It is now available for practical trials.

Science News Letter, April 7, 1945

MEDICINE

Speech Defects Increase, Ascribed to War Strain

➤ A WAR-CAUSED increase in the number of persons who stutter or suffer from other speech defects appears in the records of the National Hospital for Speech Disorders, according to the annual report by its medical director, Dr. James Sonnett Greene.

A total of 3,749 patients, the largest since the start of the hospital 29 years ago, and 800 more than the previous year, were treated during the past year, Dr. Greene reports.

The added emotional strains and conflicts brought on by wartime conditions explain the increase in Dr. Greene's opinion. Many of the patients were servicemen and ex-servicemen with speech disorders that developed under the strain of military service or had been aggravated by it.

A large proportion of these men were treated without charge. The Government is now arranging, Dr. Greene reports, a contract with the hospital under which it will assume the financial responsibility of rehabilitating veterans referred to the institution for treatment.

Science News Letter, April 7, 1945

E FIELDS

CHEMISTRY

Silicone Can Withstand Extreme Temperatures

➤ A SAND-BASED silicone, a new elastic electrical insulating enamel that will withstand continuous operation at 500 degrees Fahrenheit followed by sudden plunges into icy sea water, is the latest silicone material to be produced commercially and is to be used in the insulation of resistors that control the current fed into war radar, radio and other electronic essential equipment. It is produced by the Dow Corning Corporation.

The new silicone, which will be known as Silastic, is a rubbery, white salve-like material, that can be applied by dipping and cured at from 500 to 550 degrees Fahrenheit. In addition to passing tests for thermal shock endurance, it is waterproof, and can withstand immersion in boiling water as well as in ice water. Applied to glass cloth and tape, this coating produces a heat-resistant electrical wrapping material, and may be used in other applications to exclude moisture from electrical equipment.

Science News Letter, April 7, 1945

PUBLIC HEALTH

More Than 16 Million Entered Hospitals in 1944

➤ AMERICANS entered hospitals as patients at the rate of one person about every two seconds last year, not counting the babies who were born in hospitals at the rate of one live baby every 16.4 seconds, the American Medical Association's 24th annual hospital census shows. (*Journal, American Medical Association,* Mar. 31)

The 16,036,848 admissions to hospitals, exclusive of outpatients and newborn infants, is called "unprecedented" by Dr. F. H. Arestad and Dr. M. G. Westmoreland, in their report of the facts and figures on hospitals.

About one-fourth of these admissions, 4,287,271, were to federal hospitals and 2,257,949 to other governmental institutions.

The number of registered hospitals decreased to 6,611, which is 44 less than for 1943, but the number of beds increased to a total of 1,729,945.

In contrast to the feeling some patients may have had that they were being hustled out of the hospital pretty fast to make room for the next patient, is the figure showing that in general hospitals the average length of stay per patient increased by one-half day.

Of the 1,919,976 babies born in hospitals last year, 96.7% were born in general hospitals, with only 3.2% born in maternity hospitals and 0.1% in other institutions. The number of babies born in hospitals has tripled in 15 years.

Science News Letter, April 7, 1945

ICHTHYOLOGY

Pickerel Caught Are Often Below Legal Length

➤ THREE out of every five Eastern pickerel caught by sportsmen have to be thrown back into the water because they are shorter than the legal 12 inches, if those caught in a 200-acre pond near East Haddam, Conn., are typical.

Over 1200 fish were caught by rod and line for tagging, fin-clipping and life-history data in the summers of 1940 and 1941 as part of a cooperative project between the East Haddam Fish and Game Club and the Department of Forestry and Wild-life Management, University of Connecticut. About 64% of all the fish caught were less than the minimum legal length, Leonard E. Foote and Bradford P. Blake of the University of Connecticut report. (*Journal of Wildlife Management,* April)

There were approximately 60 pickerel per acre, and an average of three of these excellent game fish were caught each hour the sportsmen fished. They ranged in length from six to 22 inches. The smaller fish fed almost entirely upon insects while the larger ones enjoyed a bill-of-fare composed largely of fish.

Science News Letter, April 7, 1945

HORTICULTURE

Tree Bears Fruit From January Until May

➤ ONLY ONE plant patent was issued last week, as contrasted with 473 "regular" patents. This plant patent, No. 656, is on a subtropical fruit tree, as yet unfamiliar to most Americans, the cherimoya. According to the statement of its breeder, William H. Ott of Whittier, Calif., this tree bears fruit continuously from January until May, and the fruit is better adapted for commercial handling and shipping than the varieties hitherto grown.

Science News Letter, April 7, 1945

MEDICINE

Protective Cream Given G.I.'s Using Bazookas

➤ SOLDIERS using bazookas and flamethrowers, as well as tank crews, are protected against flashburns by a new cream issued to them by the Quartermaster Corps. Its prime function is to provide a "fireproof" protection for exposed parts of the body against burns from sudden flashes of flame. As such, it will probably be made available after the war to community fire departments for the protection of its fire fighters.

The cream, which comes in a pocket-size container, does not possess any medical properties and will not cure burns. It was originally developed for the use of Navy gun crews by the Naval Research Medical Institute, and has only recently been adopted by the Army.

The cream is applied in the same way as a woman's beauty mask, just heavily enough so that the skin does not show through. It will dry in about five minutes. Rain, perspiration, or fricton tend to remove the cream. It can be rapidly removed with soap and water.

Science News Letter, April 7, 1945

MEDICINE

Medical Officers Want To Become Specialists

➤ A LARGE percentage of doctors now on duty with the Army, Navy, Public Health Service and Veterans Administration want six months or more of further training in hospital or other educational work and want to qualify as specialists in some branch of medicine after the war. These desires were expressed in answer to a questionnaire sent to each medical officer. The results are reported by Lieut. Col. Harold C. Lueth, Surgeon General's liaison officer. (*Journal, American Medical Association,* Mar. 31)

More than 35% of all medical officers on duty are represented in the questionnaires studied. Of these, nearly 60% want to take six months or longer courses and 63% want to become certified specialists.

The 10 most popular fields in which long courses of further training are wanted are, in order of frequency of request: surgery, internal medicine, obstetrics and gynecology, general review, psychiatry and neurology, pediatrics, orthopedic surgery, ophthalmology, radiology and otolaryngology.

Science News Letter, April 7, 1945

MEDICINE

Play That Heals

Making belts, bowls, and vases helps the war wounded recover. Intensive course has been set up to train occupational therapists.

By MARTHA G. MORROW

➤ THESE MEN were not long ago slinging bazooka shells at Heinies. They are now using saws instead of machetes and making pocketbooks for the girl friend instead of booby traps for the Japs.

But these soldiers and sailors are still fighting this war, don't you forget it. They are fighting their way back to normal living in Army and Navy hospitals. Each activity is done on doctor's orders, just as much as swallowing the pills that he sometimes prescribes.

Handkerchief tricks, games of balancing sticks, making loosely-jointed toys dance, and even stretching a thick rubber band all help the men exercise stiff muscles as well as keeping amused both the player and the buddy in the next bed.

Men in one hospital are weaving rugs or printing a hospital newspaper because the muscles of their back, shoulder or hand have become stiff from injury or lack of use. In other hospitals soldiers and sailors will be found making men's belts or printing record cards, not so much because of physical injuries, but because they cracked under the strain of war and need something to arouse their interest and ambition.

Occupational therapy is taking a prominent part in the great program of reconditioning and rehabilitation which the Army and Navy have undertaken so that wounded men can be returned to active duty or civilian life in the best possible condition. As in the best schools of education, so reeducation for servicemen is often fun.

Learning To Do Without

Simple games, such as chess, and ping pong, when played with an understanding partner, teach a man to do things for himself now that a hook or artificial leg is pinch-hitting for his arm or leg lost in combat. Learning to tie a shoe string or type on a typewriter helps a blinded serviceman learn to adjust himself to a world without light.

Book-ends can be made from soft wood, billfolds from pliable leather, and vases molded from oozy clay—the men can choose so long as the work fills the doctor's prescription. Your friend with the injured arm, for instance, can probably take his choice between the loom and the printing press.

But just in case it hurts him to raise his arm as high as he should and he plans to "cheat" a little, a board placed across the loom forces him to reach above it to complete the pattern he is weaving. A table elevated to shoulder level makes another patient exercise his back and shoulder while making that what-not for the breakfast nook back home.

A man who has had a shell fragment wound in his forearm, damaging the nerves, muscles and tendons controlling his hand, will often find after the wound has healed that the hand is stiff and almost useless. Directed exercise, gradually increasing in strenuousness, may restore its strength and mobility. The doctor therefore writes a prescription specifying the type of injury and muscles which should be treated.

The serviceman may find an interest in clay modeling, the soft material offering the light exertion good for his weakened fingers in the early stages of reconditioning. Or he may want to build a telegraph set of his own, later sending messages on his own machine. If knotting strong thread is more to his liking, belts and suspenders which he can wear or send as gifts will keep him mentally alert as well as exercise his weakened hand and wrist.

As his hands get stronger and he can begin to close them, woodworking and carpentry may attract the serviceman's attention. Tools equipped with built-up handles, large enough to fit the half-closed hand, are furnished him at first. As he works, he becomes able to close his hand more and more until he can use regular tools and finally recovers the power to grasp any object.

Early use is made of occupational therapy so that bed patients may regain the use of injured parts. Work tables have been devised so that men can carve book ends and fancy boxes while still in bed, and miniature looms permit them to weave almost as soon as they are able to sit up.

GOOD EXERCISE—The partially paralyzed nerves which innervate the muscles of this soldier's hand and wrist are used in weaving a man's belt. Photographs by Fremont Davis, Science Service staff photographer.

The bicycle jigsaw to restore motion to injured legs, and jobs requiring such heavy equipment as metal work and printing, must wait until the patient is able to be up and around.

Although the teaching of major skills to the patients is not a major objective, frequently the men discover through their work abilities and talents which they never dreamed they possessed. Many hobbies have been developed and new lines of work first begun in this way.

Outgrowth of Last War

Occupational therapy is an outgrowth of the last war. From his post in France, General Pershing requested 200 "reconstruction aids" to keep the minds of the patients off their illnesses. After a short 12-week course in crafts and diversional type recreational work, these aids were assigned to Army hospitals.

Today more comprehensive courses are offered, accredited schools giving a three to five-year course to girls interested in doing things with their hands and having a real desire to help persons suffering from physical or mental illness.

In both the Army and Navy, occupational therapy is one phase of the reconditioning and rehabilitation program. Occupational therapists serve the Army as civilians; in the Navy they are commissioned in the WAVES. Because there is a shortage of trained personnel, accelerated programs have been instituted in both branches of the service.

Students from approved schools who have mastered the theory of occupational therapy may receive their clinical training as officers in Naval hospitals, reports Lt. (j. g.) Lois Brownell, occupational therapy adviser to the Medical Department. Enlisted men and women of the Navy Hospital Corps can qualify after a three-month hospital course in theory and practice as assistants to occupational therapy officers.

An intensive war emergency course has been authorized by the War Department under the Civil Service Commission, states Mrs. Winifred Kahmann, chief of the Occupational Therapy branch of the Army. The course offers college graduates with special qualifications four months of medical subjects and theory of occupational therapy, followed by eight months of clinical practice in an Army hospital, all at government expense.

Tact, initiative, interest in medical studies and an adaptable personality are all needed for a person to be successful in this line of work. With all the resources of the hospital at his disposal as well as a well-equipped therapy shop, it is up to the occupational therapist to devise ways of getting the patient to fill the doctor's prescription while doing something that holds his interest.

Science News Letter, April 7, 1945

ARM USEFUL AGAIN—Printing signs and record cards on the printing press at Walter Reed General Hospital aids the soldier to regain the use of his arm and fingers, a bullet having shattered the bone from his left elbow to wrist.

RESEARCH

Researches Summarized

➤ RESEARCHES on a hundred far-flung fronts, with quicker victory and pleasanter peacetime life as twin goals, are summarized in the annual report of the Mellon Institute, handed to his board of trustees by Director E. R. Weidlein. The Institute's hundred-fold scientific activity is no mere figure of speech: to be quite exact, 101 research tasks are on the schedule; 94 of them actively pursued during the fiscal year just closed, and seven that have had to be suspended for the duration.

Direct contributions to the war effort, in addition to the researches on shells and rockets, include some exciting new synthetic lubricants, on which some details have to be withheld for security reasons. One of them seems to be a member of the group known as the silicones, that, like oils, are organic compounds containing carbon, but differ in that silicon atoms are substituted for part of the carbon atoms. Other synthetic lubricants are more conventional in their makeup, but are unusual in that they do not become too "thick" in high-altitude cold or too "thin" in tropic heat, so that they can be used in such critical mechanisms as aviation gauges and flyers' wrist watches.

Other new things, useful now for war and even more useful soon in peace, include magnesium alloys, a synthetic "sand" made of ethyl silicate for making molds for fine castings, an unusual plastic material known as vinylnaphthalene, and new kinds of finely pulverized metal for use in powder metallurgy. The latter include manganese, steel and copper powders.

Research items of direct usefulness in the home include textiles with stress on the cost-of-living angle, other textiles with improved water-repellent properties, a new insecticide that may become a competitor for DDT in its deadliness to flies, and strained green soybeans for the baby.

Science News Letter, April 7, 1945

Do You Know?

The *Argentine* is now the second largest producer of vitamin A, ranking next to the United States; shark livers are the source.

The mineral *tourmaline* can be used for wavelength control in radio transmission but it is rarer and more expensive than quartz.

A single wide *tire* on heavy trucks and tractors has been found to be more efficient on soft ground and in mud than dual tires.

The world production of *plastics,* now replacing metals as a war measure, is only about one-quarter of one per cent the output of steel.

The fuzz from *cattails,* now used as a substitute for kapok in sound and heat insulation, has about 90% the warmth of the same amount of wool.

The *wood rat,* unlike the common rat, lives in the clean, open air of the country, usually in mountainous sections, with a home in a tiny cave; to scientists he is *Neotoma magister.*

Experiments on *birds* showed that the depth of the color of the yolk was related to the amount of greens fed, and a diet of white corn with no greens produced very pale-yolked eggs.

Lawns should not be *mowed* too often or too short during hot dry weather, but should be cut often enough to prevent certain aggressive weeds from forming seeds.

The hungry-looking *coyote* shot by predatory animal hunters may yield from five to seven pounds of fat usable for manufacturing munitions; the government has asked all hunters to save this fat.

The principal chemical elements held in *seawater,* mostly in the form of soluble salts, are chlorine, sodium, magnesium, calcium, potassium, bromine, boron, and fluorine; many others are found in very small quantities.

New glass *lenses* that enable pilots to detect targets obscured by haze are made of a glass composition which absorbs scattered blue light rays characteristic of haze; they are a warm rose smoke in tint.

ENGINEERING

Shortage Relieved

The manpower shortage is being helped, at least in part, through research and experimentation designed to increase war production with existing equipment.

➤ THE NATION'S manpower shortage is being relieved, at least in part, through scientific research and experimentation designed to increase war production with existing manpower and equipment, reports Richard B. Smith, executive secretary of the Manufacturing Engineering Committee of the American Society of Mechanical Engineers. This committee, created at the request of the War Production Board through the Office of Production Research and Development, has carried out at least 40 research projects during the past year, which has increased production rates as much as 1,000%.

The Committee's help is available to any war production agency for consultation about production and mechanical process problems, and it has aided industry in adopting more efficient production methods by formal research and through surveys.

Machine shops all over the country have been helped to increase machine speeds and lower costs, through information released by the Committee about high-speed milling. Data sheets, distributed to industry, outline jobs in actual operation and contain information that can be immediately applied in the shops to improve and speed up existing equipment without increasing manpower.

One project on high-speed milling is now being carried out at the California Institute of Technology under the supervision of the committee. Aircraft plants have been helped to meet their quotas for many thousands of military planes by information discovered through research. For example, speeds as high as 24,000 feet per minute are possible in machines cutting aluminum, instead of 2,000 to 3,000 feet per minute formerly thought to be satisfactory. It was also found that feeds of 200 to 300 inches per minute could be used instead of 15 or 20. In a few months such milling machines as the research had demonstrated to be practical were installed in aircraft plants.

Through the findings of the committee, one company which would have been called upon to spend $10,000,000 met its quota of planes with less than 15 additional machines and fewer than 25 new skilled workers, at a cost of less than $500,000.

Another project now being conducted is an investigation of fused quartz. Research has succeeded in producing a clear quartz practically free from bubbles with a high transmission factor for use in the forming of cells and applicators used in producing serums and vaccines for the armed forces. This quartz has the quality of transmitting ultraviolet rays through a lower range of the spectrum than any other commercial quartz.

Science News Letter, April 7, 1945

INVENTION

Patents Seized From Aliens Now Abstracted

➤ MECHANICAL, electrical and non-chemical patents, seized from enemy aliens and nationals of occupied countries by the American government, have been abstracted and the abstracts printed. They are available in five volumes containing information relative to 37,000 patents, or in separate sections by subjects. Two-thirds of the patents were granted to Germans. Abstracts of 8,000 chemical patents have previously been made available.

The patents now abstracted include such broadly diversified fields as aeronautics, brakes, electric lamps and heating, electric furnaces, foods and beverages, internal combustion engines, machine elements, motors, printing, electronics, and refrigeration, as well as many household articles. Telephony, telegraphy, textiles and tools are also included.

The abstracts consist of the inventor's claim to the patent and a reproduction of the drawing as published in the *Official Gazette* of the U. S. Patent Office.

Licenses under most of these patents are readily obtainable by any United States citizen upon application and payment of an administrative fee of $15 per patent. Over 9,000 have already been licensed by the Alien Property Custodian to nearly 700 persons or firms. This office issues all licenses.

Science News Letter, April 7, 1945

BOTANY

NATURE RAMBLINGS

by Frank Thone

Spending the Savings

▶ THE GREAT majority of familiar spring flowers spring from the underground storage organs in which foodstuffs, usually in the form of starches and sugars, were accumulated during the preceding summer and fall. Dig up almost any of the abundant species—jack-in-the-pulpit, spring-beauty, bloodroot, trout-lily, Solomon's-seal, May-apple, trillium, Dutchman's-breeches, wild iris, columbine—and you will find a bulb, or a fleshy rootstock, or a bundle of thickened roots, or some other form of vegetable savings account, which is now being spent on the beautiful and necessary business of blossoming.

It is a matter of practical necessity that this is so. The reproductive process, of which flowers are the symbol and the means, requires a considerable outlay of material and energy. Flowers do not produce this for themselves; it has to be supplied by the rest of the plant body. And annuals, plants that start anew each year from seed, require time to get their growth and to store up a surplus before they can turn to the serious and costly undertaking of producing flowers and setting seed. Hence the heyday of annual species comes in summer and early autumn.

Preparing for this year's spring flowers was really last summer's work—perhaps the work of more than one summer. The plant, starting from seed or through some form of asexual propagation, sends up a crop of flowerless leaves through one or more seasons, slowly accumulating in its underground parts the surplus of food material that is left over after its daily wants have been supplied. Then, when enough has been piled up, it is expended freely and energetically—like a thrifty human couple cheerfully spending their savings in launching a family.

Some plant species end their life cycle with one offering of flowers and seeds—they blossom once, bear their fruit and then die. Much more common, however, are plants that go on growing new underground parts, which will continue vegetative propagation even while previously accumulated stores in the matured portions are being used up in the production of flower stalks. Thus we have the formation of offsets at the base of lily and hyacinth bulbs, and continued growth at the tips of the rhizomes of May-apple, iris and Solomon's-seal. The devices are many, though similar, and the end accomplished is the same—the survival of both individual and species.

Science News Letter, April 7, 1945

Road maintenance taxes on vehicles were collected 400 years ago in Scotland.

Pregnancy, Needed Weight-Gain, and Proteins

One of the tasks imposed upon the gravid organism is to produce new tissue to the extent of almost one-fifth of its own normal body weight.* Unless protein supply in the diet is adequate, quantitatively as well as biologically, the hazard for the maternal organism increases and the development of the fetus may be impaired. The proteins of meat are of the right kind not only to lay down these new tissues, but also to provide for the stepped-up functions during pregnancy, for which proteins are essential.

*"During pregnancy the average normal woman gains approximately 18-22 pounds, which represents the growth of the uterus, breasts and other organs as well as the fetus and placenta. In other words, a pregnant woman in nine months reproduces tissue almost equivalent to one-fifth of her own normal body weight. It must not be forgotten that the chief function of protein is to supply the tissue-building material of the body, that the need for this material is increased during pregnancy and that the protein deficiency in the diet of the nonpregnant woman may become dangerous when maternity intervenes. . . . It is reasonable to assume that protein foods satisfy appetite earlier than the others and make it content with fewer calories. In this respect we have found high protein diets of value for weight restriction during pregnancy." (Arnell, R. E.; Guerriero, W. F.; Goldman, D. W.; Huckeby, E., and Lutz, A. M.: PROTEIN MALNUTRITION IN PREGNANCY, New Orleans M.& S. J. 95:114 [Sept.] 1942.)

ACCEPTED AMERICAN MEDICAL ASSN. Council on Foods and Nutrition

The Seal of Acceptance denotes that the nutritional statements made in this advertisement are acceptable to the Council on Foods and Nutrition of the American Medical Association.

AMERICAN MEAT INSTITUTE

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NUTRITION

To Combat Malnutrition

➤ WEAK, DIZZY, bedridden, often pain-racked and crazed victims of poor diet came by the thousands last year to the Nutrition Clinic at Hillman Hospital, Birmingham, Ala., Dr. Tom D. Spies, associate professor of medicine at the University of Cincinnati and founder and director of the Nutrition Clinic it maintains at Birmingham, reported to the Spies Committee for Clinical Research meeting in New York.

More than half of those who had severe pellagra would have died and one-tenth of those who lived would have spent their remaining years in mental hospitals in 1930. But in 1944 there was not a death among the 5,845 patients with deficiency diseases in the Nutrition Clinic.

More than 2,000 physicians, nurses, chemists and nutritionists from all over the nation watched these suffering men, women and children recover when the specific diet lack that caused their illness was discovered and remedied.

The visiting scientists saw thousands more sent elsewhere for treatment because their painful neuritis, eye trouble or insanity was not caused by nutritional failure and could not be treated at the clinic. The tests, examinations and careful questioning about diet habits by which diet deficiency diseases or nutritional failure can be detected even when typical signs are lacking were all demonstrated.

For Dr. Spies believes and hopes that tens of thousands who can not come to the Nutrition Clinic and may never hear of it can, through its service as a demonstration center, be saved from death, insanity and the wretched, poverty-stricken existence that may be caused by nutritional failure.

"Few physicians," he said, "realize the meticulous clinical study needed before a diagnosis of deficiency disease is justified. The science of nutrition has advanced so rapidly that the practicing physician wonders what he can include as valid in his day-to-day practice of medicine. Since the Nutrition Clinic was first established, we have felt that we should make every effort to clarify the subject for the physician and to promote wider application of earlier and better methods of treating nutritional deficiency diseases. We are trying to serve as an auxiliary to everyone interested in promoting better nutrition."

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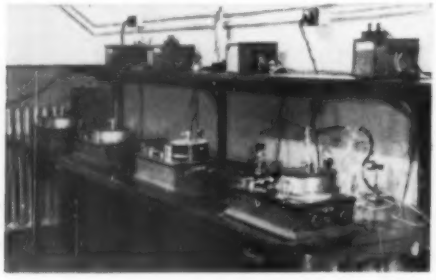

HOW COLUMBIA UNIVERSITY USES TYPE K POTENTIOMETERS

In order to provide their advanced students with a reliable setup for making highly precise measurements of potential difference and electromotive force, the Chemistry Department of Columbia University equipped their laboratory with four Type K-1 Potentiometers, shown above. The oldest of these instruments has been in use since 1912 and the youngest is several years old. All potentiometers are supplied by a single, large storage battery of highly constant voltage, and each instrument is permanently connected to a No. 2420 enclosed lamp-and-scale galvanometer.

Type K-1 has two ranges, 0-1.61 volts and 0-0.161 volts. We also supply Type K-2, with a third range of 0-0.0161 volt. It is direct-reading on the highest range, and its last tenth, hundredth, or thousandth volt is spread over a 5-meter-long slidewire. The price of the K-1 is $250, and the K-2 is $300.

For further information, see Catalog E-50B(3)

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Jrl. Ad. E(26b)

MILITARY SCIENCE

Emergency First Aid Kit Is Also a Life Raft

➤ A NEW first aid kit specially designed for use at high altitudes in B-29 Superfortresses has been developed by Col. John L. Gallagher of Valley Forge General Hospital at Phoenixville, Pa., reports the magazine, *Air Force*. The case in which the kit is assembled acts as a self-sealing buoyant life raft which will support the weight of one man for some time, if the plane is forced down at sea.

The main feature of the kit is a new pressure bandage which consists of a gauze pad stuffed with packing material, with a bandage roll attached. This forms a pliant but firm covering for large and small wounds and eliminates the need for a conventional tourniquet. It effectively binds the wound without shutting off the flow of blood. This bandage was designed for quick, easy handling by gloved hands in low temperatures while a plane is bouncing around as it does in turbulent weather or combat flying. In the case of broken bones, two or more of these pressure bandages may be used to make a comfortable temporary splint.

Other items in the new high altitude kit include a quantity of morphine kept in a special heated compartment that can be opened while wearing cumbersome flying gloves by breaking open a special built-in lock; sulfa drugs; standard dressings and a special knife that will cut quickly through several layers of heavy flying clothing when a compression bandage needs to be applied without injuring the wounded man.

Science News Letter, April 7, 1945

MEDICINE

More Disease Germs May Yield to Streptomycin

➤ HOPE that still another group of microorganisms that plague mankind with disease and death may be brought under control by streptomycin, a remedy of the penicillin class, appears in a report by Dr. F. R. Heilman, of the Mayo Clinic.

The germs are known as Friedlander's bacilli and also as Klebsiella. They occasionally cause a severe type of pneumonia and may also cause abscesses, ear trouble, meningitis, osteomyelitis, blood poisoning and a form of heart trouble. They are not uncommonly found in the sputum of patients with chronic bronchitis.

Streptomycin, Dr. Heilman and associates found, checked the growth of these germs in test-tube experiments. It protected mice from lethal doses of the germs.

Streptomycin was then given by Dr. W. E. Herrell to two patients who had respiratory infections, with Klebsiella persistently present in the sputum. The germs promptly disappeared from the sputum after streptomycin treatment was started.

The results, the scientists report, suggest that streptomycin may be useful in treating patients with infections caused by the Friedlander group of microorganisms.

Science News Letter, April 7, 1945

DDT, the new insecticide, is chemically dichloro-diphenyl-trichloroethane and is made by condensing chlorobenzene and chloral in the presence of sulfuric acid.

• Books of the Week •

➤ BUSY WARWORKERS and others who want a quick, popular-styled story of the inner-workings of the mightiest air force in the world will find THE STORY OF THE U. S. ARMY AIR FORCES, compiled and illustrated with over 100 full color maps, charts and action drawings by Jim Ray (*Garden City*, $2) a good evening's reading. It gives the answers to what planes we fight with, where we fight from, and what goes on in action. Original and authentic, this delightful book will please the least ardent adult aviation enthusiast, and make a welcome gift for a teen-age air-minded boy or girl.

Science News Letter, April 7, 1945

➤ RADIO FREQUENCY electric waves and other waves with frequencies of alternation in billions of cycles per second, are discussed in INTRODUCTION TO MICROWAVES by Dr. Simon Ramo. It is an excellent treatment for persons with some knowledge of the fundamentals of electricity. (*McGraw*, $1.75)

Science News Letter, April 7, 1945

➤ TRUE UNDERSTANDING of two of the secret weapons of this war, in lucid language the non-technical reader can enjoy, is given in ROCKETS AND JETS by Dr. Herbert S. Zim (*Harcourt*, $3). It contains the type of information that the newspaper reader needs to bring rockets and jet propulsion into true perspective. The book will prove useful in the home, school, office, and in the barracks. It is a book the progressive-thinking reader will always want at his elbow, and one to which he will refer again and again.

Science News Letter, April 7, 1945

➤ AIRPLANE CONSTRUCTION has advanced so rapidly in recent years with the development of high-speed, rocket and jet propelled aircraft that the aero mechanic, engineer, and designer often have difficulty understanding the valuable properties of currently used airframe materials, including plastics. AIRFRAME MATERIALS by F. S. Stewart (*McGraw*, $2.50) successfully correlates the most important recent advances in materials and procedures for applying them to airplanes. Written so that the student will find little difficulty in grasping the technical data, yet detailed enough to make it a valuable desk-reference book for the engineer.

Science News Letter, April 7, 1945

• Just Off the Press •

COLLEGE ALGEBRA AND TRIGONOMETRY, a Basic Integrated Course—Frederic H. Miller—*Wiley*, 324 p., illus., $3.

CONSTITUTION AND DISEASE, Applied Constitutional Pathology — Julius Bauer — *Grune*, 247 p., $4.

THE GENUS CERATIUM IN THE PACIFIC AND NORTH ATLANTIC OCEANS—Herbert W. Graham and Natalia Bronikovski—*Carnegie Inst.*, 209 p., paper, illus., $2.

IT'S FUN TO MAKE IT YOURSELF—Stacey Maney, ed.—*Jour. of Living Publishing Corp.*, 384 p., illus., $2.95.

JANE'S FIGHTING SHIPS, 1943-44—Francis E. McMurtrie, ed.—*Macmillan*, 582 p., illus., $19.

THE LIVESTOCK OF CHINA—Ralph W. Phillips and others—*Gov't Print. Off.*, 174 p., paper, illus., 30c.

MARINE BOTTOM SAMPLES COLLECTED IN THE PACIFIC OCEAN BY THE CARNEGIE ON ITS SEVENTH CRUISE—Roger R. Revelle — and RADIUM CONTENT OF OCEAN-BOTTOM SEDIMENTS—Charles S. Piggot—*Carnegie Inst.*, 196 p., paper, illus., $2.

THE STORY OF PENICILLIN—Boris Sokoloff —*Ziff-Davis*, 167 p., $2.

STRESS RELIEF OF WELDMENTS FOR MACHINING STABILITY—J. R. Stitt—*Ohio State Univ., College of Eng'g*, 47 p., paper, illus., 50c, (Eng'g Experiment Station Bull. no. 121).

TRAUMA IN INTERNAL DISEASES, with Consideration of Experimental Pathology and Medicolegal Aspects—Rudolf A. Stern—*Grune*, 575 p., $6.75.

THE WORLD AT WAR, 1939-1944, a Brief History of World War II—Military Intelligence Division, War Dept.—*Infantry Journal*, 416 p., paper, illus., 25c.

Science News Letter, April 7, 1945

New square *milk bottles* are popular because they conserve space.

To secure best results in *quick-freezing* sausage meat and ground beef, salt should be omitted because it seems to stimulate oxidation; sage, pepper, mace, ginger and other common spices aid in the preservation.

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⚙ *CAMERA SUPPORT, one end of which rests on one shoulder and the other is grasped by one hand, holds the instrument on a flat surface in front of the face. An adjustable strap over the shoulder permits the support and camera to be carried, when not in use, swinging under the arm.*

Science News Letter, April 7, 1945

⚙ *INSULATION resistance tester is a crankless American improvement on instruments of the same capacity formerly imported. It has a spotlight galvanometer with a 100-millimeter scale, calibrated 0-20,000 megohms for direct reading, at a potential of 500 volts. Power is supplied by dry cells.*

Science News Letter, April 7, 1945

⚙ *ELECTRIC TESTER, fountain pen size, has a tiny neon lamp and two contact tips separated in use by the thumb and a finger. It tests for live wires, grounded lines, open circuits, shorts and polarity, and indicates voltages from 90 to 500 volts, AC or DC, by the glow-intensity of the light.*

Science News Letter, April 7, 1945

⚙ *FOUNTAIN COMB, that wets the hair as it combs, has an elongated liquid container along one side of its back with openings through which the liquid leaks onto the teeth when in use. No leakage takes place when the comb is resting on a flat surface with the reservoir side downward.*

Science News Letter, April 7, 1945

⚙ *CONTROL UNIT, for a new all-metal thermocouple vacuum gauge, operates directly on 100-volt AC and indicates low pressures accurately and continuously. The light, portable instrument, pictured above, may be carried about and connected to thermocouple gauges in any part of the factory vacuum system.*

Science News Letter, April 7, 1945

⚙ *TRANSMISSION belts for machinery now have steel cables in the carcass instead of cord or fabric. The cables are made of highly flexible, special twisted, finely stranded, high-tensile wire, and are imbedded in rubber and encased in a fabric envelope.*

Science News Letter, April 7, 1945

⚙ *SELF-IGNITION attachment for cigars and cigarets is a small device which is put over one end of the cigar. It has a cup-shaped center that contains a material, such as pyrophoric iron or lead, that ignites when air is drawn through it. A cap prevents burning when not in use.*

Science News Letter, April 7, 1945

⚙ *AMPHIBIOUS VEHICLE, recently patented, is a luxurious cabin cruiser which is quickly convertible into an auto trailer and may be used for campers on water or on land. Automobile wheels, which carry the vehicle when on shore, retract into compartments in the hull when in water.*

Science News Letter, April 7, 1945

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, *1719 N St., N. W., Washington 6, D. C., and ask for Gadget Bulletin 253.*

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